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Japanese Imperialism in Global Resource History

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This paper explores the ways in which global resource allocation affected the pattern of Japanese (and later East Asia's) industrialisation, and how it eventually came to underpin the course of Japanese imperialism and aggression in the 1930s.

The Western impact on Asia during the second half of the eighteenth and the nineteenth centuries has usually been associated with colonial rule in South and Southeast Asia and the forced opening of East Asian ports to foreign trade. With the coming of colonial administration and modern transport, Asia became incorporated into the West-dominated international order. The exchange between Asian primary products and Western manufactured goods grew, and Western capital flew into Asia to finance railway construction and the development of mines and plantations. In this story imperialism functioned as an institutional device to ensure trade and capital flows in Western terms, that is, under the protection of Western human security and private property rights (For the specifically British position of imperialism of free trade, see Gallagher and Robinson 1953). Modern political ideas and legal institutions were introduced to Asia for that purpose. But industrialisation was not encouraged. In fact it was often discouraged, though not always intentionally.

In order for Meiji Japan to industrialise in this West-dominated international order, therefore, a different kind of international division of labour with Western powers had to be found (Sugihara 1996). As Asia's exports to the West grew and primary producers' income began to rise, albeit slightly, a new demand for modern mass consumer goods was created. Most of them were low-wage goods, and included cheap cloths, matches, toys and other sundries. Japan thus specialised in producing these goods, which were not worth producing in the West where real wages were rising, while she continued to import capital-intensive products such as machinery and transport equipments from the West (see Figure 1). Although the demand for modern mass consumer goods in Asia was initially confined to urban or commercialised areas, it could potentially be extended to the vast domestic markets of India, Dutch East Indies and China. And this demand would be better met by those Asian manufacturers who would have the will and access to information to mould their consumer goods around the local consumer taste.

The Meiji government pursued labour-intensive industrialisation by specifically targeting at this kind of market. Thus, although the introduction of industrial technology is usually expected to replace labour with capital, the more complex adaptation was attempted when Western machinery and factory system were introduced to Japan. The replacement of labour with machinery was accompanied by the simultaneous effort of replacing

capital by labour wherever technology was thought to be biased towards capital in the light of local factor endowment options. For example, the iron frame was partially replaced by the less strong but cheaper wooden frame, while the night-shift system lowered the capital-labour ratio within the modern factory. In this way prewar Japan yielded an almost a laboratory case of labour-intensive industrialisation.

In trying to find a complementarity with Western powers on the one hand, and with Asian primary producers on the other, Japan abandoned uncompetitive traditional agriculture by encouraging imports of raw cotton and sugar, and eagerly imported the technologically advanced machinery and transport equipments from the West till the domestic industry became competent. The only uncompetitive sectors it sought to foster were those that were thought essential for military purposes.

In a less coordinated way but in some specific cases not necessarily later, China also attempted to introduce Western technology and organisations since the second half of the nineteenth century, and went through import-substitution industrialisation during the interwar period. The type of industries developed was characteristically labour-intensive, reflecting the availability of relatively cheap labour of a good quality. Meanwhile, South and Southeast Asia, which lacked the independent government to pursue an industrialisation strategy, lagged behind, and allowed the imports of East Asian manufactured goods to their

markets in large quantities during the interwar period. The ready access to colonial markets in South and Southeast Asia was an additional background to East Asia's industrialisation.

The above is a summary of my understanding of how East Asia's industrialisation occurred under the West-dominated international order. In attempting to clarify this story further by placing it in the global context, this paper outlines East Asia's response to the "great divergence" (Pomeranz 2000) that took place in the West in the nineteenth century, and discusses how it eventually drove Japan to colonialism and aggression in the 1930s.

East Asia's Response to the Great Divergence

The idea of the "great divergence", which made the Atlantic economy quite distinct from the rest of the world in terms of resource endowments and factor prices, adds a new dimension to our understanding of labour-intensive industrialisation in East Asia. First, it singles out two most important factors, the ready access of coal and the availability of vast resources in North America, which directed the real wage in Western Europe and North America to rise, especially since the second half of the nineteenth century (see Table 1). On the face of it, this has little to do with what the literature on modern Asian history has had in mind when referring to the "Western impact", colonialism or imperialism. Yet a swift move towards the high-wage economy acted as a major factor for the

diffusion of industrialisation, by giving room for Japan, and later China, to capture the huge Asian mass consumer market with the use of cheap labour. Without the great divergence, the wage gap would not have widened as fast as it actually did, and the low-wage competition worldwide would have continued into the late nineteenth century, making it much more difficult to form the kind of regional specialisation which took place.

An underlying assumption for the East Asian strategy was that the opportunities for emigration from Asia to the West were quite limited. Since the nineteenth century Asian immigration to North America and Australasia was severely restricted (for general discussion on international migration, see Sugihara 1999). Table 2 suggests that the flow of Asian immigrants was discouraged by the restriction of entry of women. After the conclusion of a gentleman agreement with the U.S. government in 1907 the Japanese government insisted on allowing American Japanese to be able to marry Japanese women and bring them to the United States, inviting a media attention to the practice of “picture bride”. Clearly, India as a British colony and China as a country with a government less able to negotiate with the United States, were unable to help immigrants in this respect. Looking back, the overall effects of the restrictive immigration policy might be interpreted to have been that resource-rich parts of the New Continents abandoned the entry to the international low-wage competition by opting for the intake of

relatively high-wage workers only, thus paving the way to labour-intensive industrialisation in East Asia.

Second, it is important to note that the two “contingent” factors (coal and North America) have little to do with science and technology itself. The latter of course had a lot to do with making these windfalls possible, but, from the East Asian point of view, the crucial point was that the fruits of the industrial revolution, such as steam engines and the knowledge of mechanical engineering, were not culturally or ecologically tied to the West but were of a universally applicable nature. Indeed the English economy during the industrial revolution was not particularly a high-wage economy, and, in terms of factor endowments, arguably resembled East Asia than Western Europe at the end of the nineteenth century.

Of course, the windfalls themselves further generated technological advance, to make industrial technology more efficient to the resource-rich environment. By the time the Iwakura Mission of the Meiji government visited Europe and the United States in the early 1870s, it was easy to recognise that the machinery, the factory system and railways they saw operating in the West were too capital-intensive for the direct introduction to Japanese soil. But this was something that they could adjust (as was the case with the power loom partially going back to the wooden frame), since the mid-nineteenth century technological advance was essentially an additional development rather than fundamental change. Thus, by the second half of the nineteenth century, industrial technology and

accompanying organisational innovations (such as factory system) were made available to the East Asian economy, while at the same time there was a tendency for the more advanced Western economies to opt out of the international competition on labour-intensive goods.

This leads us to the third point. The standard literature portrays that Meiji Japan and other East Asian industrialisers were “late-developers”, trying to catch up with the West. This is not wrong in so far as it captures aspects of technological and organisational borrowing and adaptation. But it is a one-sided observation, as it ignores the peculiarly late nineteenth century reality of a sudden widening of resource gap, as a result of the great divergence. Italians and Swedes were beginning to enjoy the option of emigration to the New World and the English were importing cheap wheat from North America, and Western Europe was gradually becoming integrated into the orbit of the high-wage economy driven by the dynamics of the Atlantic flows of trade, migration and capital, whereas the Japanese concentrated on emulating the labour-intensive technology of the pre-windfall capital-labour ratio. Thus East Asia became a more natural heir of the English industrial revolution than the leading members of the Atlantic economy, without actually meaning to do so.

To emphasise this connection is not to deny that the initial conditions in East Asia played an important role in it. On the contrary, I have argued that there was an East Asian path of

economic development at least since the sixteenth century with distinctive technological and institutional characteristics (Sugihara 2003; see also Pomeranz 2001). Both labour-intensive technology and labour-absorbing institutions were developed in the region prior to the nineteenth century, and they provided a particularly high degree of responsiveness to the Western impact. It is now widely recognised that, in spite of substantial political, cultural and social differences, the core regions of East Asia and Western Europe had surprising resemblances in terms of the level of living standards, proto-industrialisation and the commercialisation of agriculture at the end of the eighteenth century. If we term this “Smithian growth” in the culture-neutral sense, the speed and ease with which Japan and later East Asia acquired radically different sets of knowledge and skill makes it possible to suggest that, the East Asian path turned out to look more like a natural heir of Smithian growth than the Western path did.

Finally, industrialisation diffused beyond the Western civilisation from the late nineteenth century onwards, not because it was a product of that civilisation but because it acquired the culture-neutral character which transcended political, cultural and social specificities of the West. Science-based technology, not resource allocation, was the vital link, which encompassed a variety of cultures and institutions and, together with the initiatives of financial and service sector interests (Cain and Hopkins 2001; Sugihara 2002), moved global transformation forward. Building a

society with science-based technology involved urbanisation and the modernisation of social values and norms. It was not a simple matter of the transfer of technology, but the implications of that transfer had to be interpreted and endorsed by the culture-neutral language, in order to convince people in different civilisations the case for industrialisation.

The role of science-based technology in nineteenth century global history must therefore be assessed, not only in terms of productivity increase within the same civilisation, but also in the context of cross-cultural (cross-civilisational) diffusion. Having largely escaped Western colonial rule and endowed with high initial conditions, East Asia emerged as the only region that was capable of testing its culture-neutral quality to the full at the end of the nineteenth century. Although the region's size of industrial production was relatively small at that time, the success of culture-neutralisation of science-based technology in East Asia was to prove crucial to the global diffusion of industrialisation for the rest of the twentieth century.

Resources and Technology in the Age of the East-West Divide

By the early twentieth century the technological and institutional paths of economic development of the West and East Asia were differentiated in terms of the respective position in the world economy. The West specialised in capital-intensive

technology with the use of skilled, high-wage labour, while East Asia specialised in labour-intensive technology with the use of low-wage labour of a good quality. Both made technological advance over time, following different paths, and the two paths increasingly interacted with each other. But they did not converge. The interactions brought about technological fusion, hence a degree of convergence, but they also reinforced and exaggerated the divergence, largely as a result of uneven global resource allocation.

The case of Japan illustrates the point. On the one hand, she developed a technological and institutional capability for producing labour-intensive goods, and successfully upgraded the type of manufactured goods she specialised in the Asian international market, in accordance with a slow but steady rise in living standards and income of Asian peoples (Figures for China in Table 1 suggest a fall in living standards, but this is consistent with the fact that living standards of a large population in coastal China rose. The same was true in parts of Southeast Asia. In both cases living standards in the richer parts were similar to Japan's). By the 1930s the type of cotton textiles Japan was producing began to resemble those of Lancashire, traditionally the main provider of higher-range textiles. The Japanese strength in this competition was not just a result of devaluation and industrial policy, but of the steady upgrading of labour-intensive technology (including the blending technique of raw cotton of different qualities and the introduction of

Toyoda automatic looms) (Sugihara 1989). Meanwhile, import-substitution proceeded, and the more labour-intensive and the less skill-intensive sectors of machinery industry became progressively technologically independent.

At the same time, seeking complementarity remained essential for Japan, because a very large section of heavy and chemical industries, as well as the cotton textile industry, the largest industrial sector, needed raw materials and energy from abroad. In order to appreciate the severe resource constraints industrialisation generate, It is useful to imagine how much land England would have needed to industrialise in the early nineteenth century, if there had been no foreign trade and all the fuel and raw materials had to be domestically produced. This is the line of thinking that led Pomeranz to argue for the significance of the trade with the Caribbean and the “windfall” of North America.

A century later, Japan had exactly the same problem of needing a primary producer cum non-competing importer of labour-intensive goods or a “windfall” or both, to upgrade the industrial structure along the labour-intensive path. Thus Japan colonised Taiwan in 1895 and Korea in 1911. In both colonies she introduced the land reform and labour-intensive technology (better seeds, irrigation and double cropping) (Nakamura 1974), not only to impose the land tax but also to make agricultural surplus available for home consumption. In turn she exported manufactured goods and offered services to her colonies. It was substantially

land-intensive imports, rice and sugar from Taiwan and Korea, that Japan secured as a result. Thus, at least in the initial period of Japan's industrialisation, she was able to use colonial trade to her advantage, without inviting the low-wage industrial competition from there. Even in the interwar period, both colonies were much more strongly tied to Japan through trade than Western colonies in Asia were to their respective rulers. 91 per cent of Korea's exports went to Japan and 71 per cent of her imports came from there in 1928, while 87 per cent of Taiwan's exports and 69 per cent of her imports were conducted with Japan in the same year. These figures remained roughly at the same level in 1938.

In the regional context of labour-intensive industrialisation, however, it is worth emphasising that there was a relatively free technological transfer from Japan to China. After 1912 East Asia saw the beginning of inter-state competition, with China pursuing import-substitution industrialisation. Japan, along with the United States and Europe, was a major source of inspiration of Chinese industrialists and entrepreneurs. Japanese industrial technology was transferred to Korea and Taiwan as well, in so far as it was of a non-competing nature and was broadly conceived as enhancing the economic strength of the Japanese empire.

Even so, East Asia's industrialisation efforts were fundamentally conditioned by the relatively weak resource endowment base within the region, given the level of technology and the availability of capital at the time. A variety of raw materials

and energy had to be imported from outside the empire. Imports of land-intensive raw cotton from India and the United States, for example, were indispensable to Japanese industrial progress in the early twentieth century. In other words, both colonialism and the regime of free trade in Asia and the world were important conditions for Japan's economic development. Japan took advantage of the West-dominated international order of imperialism to carry out trade and industrialisation from the late nineteenth century. By the 1920s Japanese imperialism became a significant part of that order, and in the 1930s it became a major force demanding an increasingly larger role, especially in Asia's regional order.

Japan as Resource Imperialism

As by then coal and other mineral resources were much more systematically brought into the industrial product chain, however, an additional, the more geologically specific problem of securing mineral resources emerged. Clearly, the ecological specificity mattered in the early nineteenth century too, since it was possible to produce raw cotton only in a certain climate and coal had to be found at a good location to serve as a competitive source of energy. But by the early twentieth century the world was much more closely connected through steamships and railways. In other words, technology gradually began to help solve uneven global resource allocation through trade.

While this eased the local resource problems by lowering freight rates, it also increased the intensity of international competition. Put another way, the question became more of efficiency than of availability. And efficient fuel and good quality raw materials tended to be concentrated on the specific regions of the world, triggering the fierce competition among the major powers for securing mineral deposits under their control. Perhaps the most representative good that characterised twentieth century global resource history was oil. Estimated oil deposits were concentrated on the United States and the Middle East. More importantly, a handful of American, British and Dutch capital dominated the exploration business and the sale of crude oil, partly because the nature of the business was highly speculative and capital-intensive. At least part of the oil industry was also driven by top technology. Price fluctuations were frequently controlled by international cartels.

Japan was not late in exploring domestic oil deposits, but was in no position to enter into international competition in this highly capital-intensive and politically sensitive industry. By 1920 the amount of imported oil (crude and refined) exceeded that of domestic production, and by 1928 refined oil imports exceeded the domestic refined oil production (Iguchi 1963: 212). Table 3 is an attempt to show the large resource gap between advanced Western countries (the United States and Western Europe) and East Asia (In this table “Socialist Asia” [mostly China] and Japan), in terms of

energy consumption in coal equivalent terms. Even if these data cannot be expected to be precise, there is little doubt that East Asia had used much less commercial energy (mainly coal, liquid gas and crude oil) for a person to produce a unit of GDP before the Second World War. Table 4 implies that non-commercial energy sources (such as firewood) remained important for East Asia even in the 1950s.

More generally, other minerals and raw materials required for Japan's heavy and chemical industries tended to be concentrated on certain locations, much of it in the British Empire and sphere of influence. Japan relied on British Malaya and Australia for iron ore, India for pig iron, Canada for aluminum and lead, Canada and Australia for zinc, British Malaya for rubber, and the United States and the Dutch East Indies for oil.

The crucial turning point came with the Wall Street Crash of 1929. One of the vital assumptions that Japan had made, that is, export earnings were to be used for imports of raw materials and energy sources, had been severely undermined. Her exports of raw silk to the United States collapsed, and her attempt to restore the gold standard in 1930 had failed almost immediately, as Britain left the gold standard in 1931. Japan reacted to this by sharply devaluing the yen and exporting heavily to South and Southeast Asia (Kagotani 2000). She also pegged yen to sterling in 1932, and kept a degree of complementarity with Britain as the "imperial structural power" by effectively remaining part of the 'sterling area'

(Akita 2003), even though Japan’s economic diplomacy seeking co-operation was not always successful (Best 2002).

A major effort was made to secure some of these raw materials and energy sources in the form of the establishment of ‘Manchukuo’, a puppet state, in 1932. A variety of economic factors - investment, markets and emigration - motivated Japan's advance into Manchuria, but securing raw materials and energy sources was certainly one of them. However, Manchuria, while absorbing vast amounts of capital and manpower, failed to become an adequate supply base for raw materials and energy sources. In fact, Japan's need to import them from outside the yen bloc increased, as a result of her commitment to the building of Manchukuo (Yamamoto 2003).

Resource issues were behind Japan’s advance to North China as well. She wanted to secure the supply of the American-type long-staple raw cotton produced there, and this was resisted by the Chinese spinners of Shanghai who also needed it, and the Nationalist government who attempted import-substitution. Inter-East Asian competition in cotton trade was the most important economic factor behind the outbreak of the Sino-Japanese War in 1937. Furthermore, the stronger China's resistance, the heavier Japan's burden became. Even if the conflict had been resolved, Japan would still have been largely dependent on the West for raw fibres and for the raw materials for her heavy and chemical industries. It was practically impossible to envisage autarky while at the same time pursuing rapid heavy and chemical industrialisation.

Even more serious were the domestic difficulties arising from the relative shortage of land. The level of agrarian rents was extremely high, and, in spite of high land productivity, labour productivity remained low by international standards. This set a ceiling for the rise in rural purchasing power and the standard of living of the peasant household. Because the bulk of industrial labour continued to come from the countryside, industrial wages were kept down as well. Under these circumstances, there was a limit to the expansion of the domestic market. The more East Asia industrialised along the labour-intensive, resource-saving path, the greater the resource gap between East Asia and the West became. Furthermore, the Japanese living standards were rising, but so were the Western, and a large gap with major Western powers remained. It was hard to be convinced that the gap was narrowing steadily (see Table 1) (Sugihara 1997).

Japanese oil imports rose sharply in the 1930s, and by the end of the 1930s took up a significant proportion of domestic energy consumption. When the Second World War broke out in Europe in 1939, it seemed too good an opportunity for Japan to miss, and Japan seized resource-rich parts of Southeast Asia, including oil in Borneo. This made the second American oil embargo (which blocked the Japanese commercial fleet carrying oil from Borneo to Japan) in August 1941 the most effective pressure on the energy-scarce Japanese economy. Within the space of five months she went to war with the United States. Meanwhile, it turned out to

be the Chinese resistance, in particular Mao's strategy for protracted war, that pinpointed the vulnerability of resource-scarce Japan opting for war. Having lost both prospects of further territorial expansion and conditions for free trade, Japan became unable to formulate any sustainable resource strategy.

Implications for Postwar Japanese Development

The Japanese experience of imperialism and aggression must be understood, first and foremost, by identifying the factors that drove specific political and military actions. Economic motivations played a part in this, but only a part. On the other hand, the resource gap loomed large in culminating the sense of Western domination and despair among the Japanese, often beyond the realm of economic affairs. Resources, rather than technology, seemed to be sustaining the East-West divide. Thus "catching up" with the West came to be confused with securing political and economic power with matching resources.

In fact, it must have been possible for Japan to discover a way of extending labour-intensive industrialisation with the less resource-intensive and the more technology-based methods. Unlike resources, relevant Western technology was available for the East Asian labour-intensive path to adapt. And Japan was among the first that had absorbed Western technology efficiently for much of the period of industrialisation. Indeed there were some Japanese

scientists who advocated this line of thinking in the 1930s and the early 1940s. However, faced with the Great Depression and the collapse of world trade in the 1930s, securing raw materials looked more pressing needs, and Japan, diverging from the labour-intensive path she had built up, attempted to continue unsustainably rapid heavy and chemical industrialisation with the hope of securing a progressively larger share of global resources. It was the Japanese failure to come up with a more sensible strategy that led to aggression and war. It also constituted a part of the adjustment process of global resource allocation through violent means.

One of the most heated postwar Japanese debates centred on whether Japan should aim at high economic growth through the growth of foreign trade, or expand the domestic market with the more autonomous resource base (of coal). By the early 1960s the decision was made to go for the former option, with the implicit but firm understanding that imports of oil from the Middle East were to be financed by export earnings. Export industries were expected to combine cheap labour (by the Western standards) with technology of a resource-saving type, and the government from time to time did not hide its expected export earnings ratio to energy consumption for each strategically important industry. Thus the postwar strategy was even more dependent on the regime of free trade than prewar.

The outcome of this decision was two-fold. First, Japan steadily

developed resource-saving technology in the second half of the twentieth century, to become one of the technologically most advanced countries in the world. Japan's per capita energy consumption for producing a unit of GDP remains roughly a half of that of the United States. And a number of other Asian countries has benefited from the transfer of Japanese technology. In East and Southeast Asia urban living conditions in the 1960s to the 1980s were poor by Western standards, and energy consumption for transport and household sectors was much lower than in the West too (Darmstadter 1971; Schipper and Meyers 1992). The labour-intensive, resource-saving path of economic development underpinned the "East Asian miracle".

Second, this has been achieved through land-intensive imports from North America and Australasia and oil imports from the Middle East, under the regime of free trade enforced by the structural power (especially with respect to the military and key currency) of the United States. Table 5 confirms the persistence of a very large trade deficit of Japan (and NIES) with the Middle East in the most recent years, part of which has been settled, multilaterally, through Europe's trade surplus with the Middle East and Japan's trade surplus with Europe. To some extent the United States also played a role similar to Europe in this context. From the perspective of this paper, postwar Japan has therefore solved only a half of the prewar problem, by lowering energy intensity substantially. The other half remains essentially as it was in the

1930s, in so far as global resource allocation and the stability of the international economic order remain substantially beyond Japanese control. The sheer gap between technological capability and resource vulnerability continues to affect Japan’s foreign policy.

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Table 1 Comparisons of Per capita GDP, 1820-1950: East and West

	1820	1870	1890	1913	1933	1950
Western Europe	1,270	2,086		3,688	*3,851	5,013
United States	1,257	2,445	3,396	5,301	4,783	9,561
Japan	669	737	1,012	1,387	2,120	1,926
China	600	530	540	552	578	439
World	667	867		1,510		2,114

Sourcesand Notes: Maddison 2001:264 and 206, supplemented by Maddsion 1998: 158 and Maddsion 1992:196 and 212. Figures from different sources only rou conrrespond to one another. *1932.

Table 2 Proportion of Female Migrants to the United States, 1820-1928

Asia		Northwestern Europe	
Indian	1	Belgian	36
Chinese	5	Dutch	37
Korean	17	Swiss	37
Japanese	33	Scandinavian	38
		Welsh	40
Sotheastern Europe		English	42
Bulgarian	10	German	42
Rumanian	18	Scottish	42
Greek	23	Irish	48
Italian	25		
Russian	31	Americas	
Polish	34	Mexican	32
Portuguese	37	Spanish American	34
Jewish	46	Canadian	39

Source: Gabaccia 1996: 92.

Table 3 Trends in Energy Consumption by Country or Region, 1925-1965

	1925			1938			1950			1965		
	Energy C.	GDP	Population	Energy C.	GDP	Population	Energy C.	GDP	Population	Energy C.	GDP	Population
United States	717.7	731,402	116,284	669.4	699,805	130,476	1,201.0	1,455,916	152,271	1,881.6	2,607,294	194,303
Western Europe	499.4	813,821	205,600	599.8	1,040,727	220,534	600.0	1,286,544	256,616	1,132.9	2,623,071	286,640
USSR	25.3	231,886	158,983	176.3	405,220	188,498	303.3	510,243	180,050	880.6	1,068,117	230,900
Socialist Asia	23.7	277,878	480,425	27.3	296,914	513,336	43.1	247,535	557,065	323.0	537,542	746,769
Japan	30.5	107,948	59,522	62.4	169,367	71,879	45.8	160,966	83,563	188.6	586,744	98,883
NIES/ASEAN	6.0	109,042	96,469	19.4	146,411	119,998	12.1	146,034	158,637	51.2	303,986	227,238
World	1,484.5	2,964,514	1,982,918	1,790.1	4,144,739	2,248,936	2,610.9	5,336,099	2,524,547	5,474.6	10,770,826	3,327,615

	1925			1938			1950			1965		
	Energy C. per GDP	Energy C. per capita	Energy C. per GDP per capita	Energy C. per GDP	Energy C. per capita	Energy C. per GDP per capita	Energy C. per GDP	Energy C. per capita	Energy C. per GDP per capita	Energy C. per GDP	Energy C. per capita	Energy C. per GDP per capita
United States	981	6,172	114	957	5,130	134	825	7,887	126	722	9,684	140
Western Europe	614	2,429	126	576	2,720	106	466	2,338	120	432	3,952	124
USSR	109	159	17	435	935	12	594	1,685	107	824	3,814	190
Socialist Asia	85	49	41	92	53	41	174	77	97	601	433	449
Japan	283	512	17	368	868	13	285	548	24	321	1,907	32
NIES/ASEAN	55	62	5	133	162	5	83	76	13	168	225	38
World	501	749	993	432	796	805	489	1,034	1,235	508	1,645	1,691

Sources:
All figures for energy consumption, Darmstadter 1971; all figures for GDP and population, Maddison 1992, Maddison 1998 and Maddison 2001. Includes estimates.
Notes:
1) Energy consumption is expressed in million metric tons (coal equivalent). GDP is expressed in million 1990 dollars, and population in thousands. Energy consumption per GDP is in metric tons; Energy consumption per capita is in thousand metric tons; Energy consumption per GDP per capita is in thousand metirc tons. Commercial inanimate energy only. Excludes human effort and that of draft animals as well as the output and consumtion of veretal fuels such as firewood and dung. Covers solid fuels (coal, lignite), liquid fuels (crude oil), natural gas, and hydroelectricity.
2) Western Europe refers to Austria, Belgium, Denmark, Finland, France, Germany (including East Germany for 1950 and 1965), Italy, Netherlands, Norway, Sweden, Switzerland, and . United Kingdom. Energy consumption calculated from Darmstadter 1971, 654-59 and 664. GDP and population from relevant pages of Maddison 1992 and 2001.
3) For GDP for USSR, 1928 figure was used for 1925.
4) Socialist Asia refers to mainland China for 1925 and 1938, China, North Korea and Monglolia for 1950, and the three countries plus North Vietnam for 1965. Energy consumption calculated from Darmstadter 1971, 729 (Communist Asia). Population and GDP for 1950 and 1965 from relevant pages of Maddison 1992 and 2001. A half of Vietnam's GDP and population figures were assigned to North Vietnam. GDP for 1925 and 1938 were calculated from Maddison's 1998 estimate for 1933 (Maddison 1998, 158), assuming per capita GDP being constant between 1925 and 1938.
5) NIES/ASEAN refers to Korea, Taiwan, Philippines, present Indonesia and Thailand for 1925 and 1938; South Korea, Taiwan, Hong Kong, Philippines, Indonesia, Malaya and present Singapore, and Thailand for 1950 and 1965. Energy consumption calculated from Darmstadter 1971, 677-81. For GDP for Philippines and Thailand, 1928 figure was used for 1925. For GDP and population for 1950 and 1965, the territorial coverage is Malaysia rather than Malaya.
6) 1925 figure for world population was calculated by multiplying the 1929 estimate (Maddison 1992, 226) by the ratio of the 1925 population of all the regions included in this table to the 1929 population of the same. 1938 figure for world population was obtained by multiplying the Maddsion 56 countries sample figure for 1938 (Maddsion 1992, 210) by the ratio of his 199 countries estimate for 1929 to his 56 countries sample figure for the same year. 1925 figure for world GDP was calculated in the same way as world population, using the 1929 estimate (Maddison 1992, 227). China 's GDP for 1929 was calculated as per 4). 1938 figure for world GDP was obtained in the same way as world population, using Maddison's 56 countries sample figure for 1938 (Maddison 1992, 211).

Table 4 Relative Weight of Commercial and Non-commercial Energy, c.1956

	Commercial	Non-commercial	Total
Africa	48	51	100
North America	97	3	100
Central America	65	35	100
South America	55	45	100
Asia (incl Middle East)	42	58	100
Europe	93	7	100
Oceania	87	13	100
World	85	15	100

Source and Notes : Darmstadter 1971, 818. Taken from UN, *Proceedings of the International Conference on the Peaceful Uses of Atomic Energy*, vol.1, *The World's Requirements for Energy: The Role of Nuclear Energy*, New York, 1956, pp.18-20. Communist countries are excluded from tabulation.

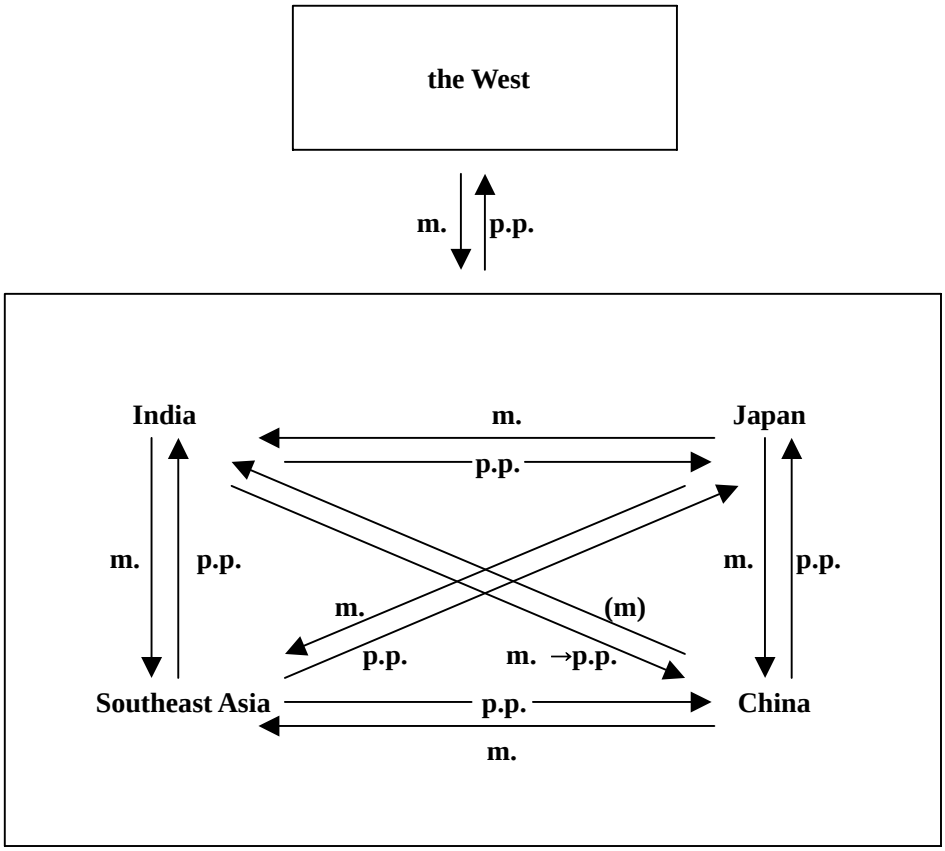
Table 5 Changes in the Balance of Trade of the Middle East with Major Trading Partners, 1985 to 2000

(million dollars)

	1985			1990			1995			2000		
	Exports	Imports	Balance	Exports	Imports	Balance	Exports	Imports	Balance	Exports	Imports	Balance
United States	9151	9940	-789	18972	13970	5002	16419	19064	-2645	36519	23711	12808
Japan	20955	12966	7989	28524	10467	18057	25539	8954	16585	44728	11506	33222
NIES	6551	4444	2107	12319	5687	6632	19412	7352	12060	40945	15659	25286
ASEAN	2298	995	1303	3920	2918	1002	5021	4647	374	13759	6736	7023
China	1764	194	1570	1366	579	787	1960	3915	-1955	9174	7538	1636
Europe	28624	37906	-9282	35245	52665	-17420	27646	57561	-29915	46615	68237	-21622

Sources: IMF, *Direction of Trade Statistics Yearbook*, and *Taiwan Statistical Yearbook*., relevant years.

Figure 1　Japan, Intra-Asian Trade and World Trade, c.1900-1930



Note: m. refers to manufactured goods, p.p. primary products. Since the late nineteenth century India exported cotton yarn to China in large quantities, but from the end of the 1910s, it was replaced by the exports of raw cotton. China exported a small amount of silk textiles in turn.

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